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(71) Applicant (for all designated States except US): BP
CHEMICALS LIMITED [GB/GB]; Britannic House, 1
Finsbury Circus, London EC2M 7BA (GB).

(72) Inventors; and

(75) Inventors/Applicants (for US only): BASSET,
Jean-Marie [FR/FR]; 18, Chemin J.B. Gilliard, F-69300
Caluire (FR). BRES, Philippe [FR/FR]; 2, allée Jules
Marey, F-13500 Martigues (FR). COPERET, Christophe
[FR/FR]; 136, avenue Thiers, F-69006 Lyon (FR).
MAUNDERS, Barry, Martin [GB/GB]; "Woodlands",
5 Paddock Way, Woodham, Woking, Surrey GU21 5TB
(GB). SOULIVONG, Daravong [FR/FR]; 8, Rue Turbil,
F-69003 Lyon (FR). TAOUFIK, Mostafa [MA/FR]; 29,
avenue Maurice Ravel, F-69140 Rillieux-la-Pape (FR).
THIVOLLE-CAZAT, Jean [FR/FR]; 5, rue Gambetta,
F-69270 Fontaines-sur-Saône (FR).

(74) Agent: PREECE, Michael; BP International Lim-
ited, Patents & Agreements, Chertsey Road, Sun-
bury-on-Thames, Middlesex TW16 7LN (GB).

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(54) Title: PROCESS FOR CONVERTING METHANE INTO ETHANE

(57) **Abstract:** The invention relates to a process for producing ethane comprising contacting methane with a metal catalyst selected from metal hydrides, metal organic compounds and mixtures thereof. It also relates to a process for the conversion of methane to carbon-containing products comprising contacting methane with a metal catalyst comprising at least one metal, Me, chosen from the lanthanides, the actinides and the metals from Groups 2 to 12 of the Periodic Table of the Elements, so as to produce ethane in a proportion of at least 65%, especially at least 98% or 99% by weight with respect to carbon-containing products formed in the process. The process can be a single-step process, preferably carried out under conditions involving a non-oxidative catalytic coupling of methane, in particular under operating conditions maintained substantially constant, preferably continuously, during the ethane production, e.g. at a temperature ranging from -30°C to +80°C, preferably from 20°C to 500°C, under a total absolute pressure ranging from 10⁻³ to 100 MPa, preferably from 0.1 to 50 MPa. The metal catalyst may be chosen from metal catalysts supported on and preferably grafted to a solid support. One of the main advantages of the present invention is to produce ethane with a very high selectivity.